

**PRE-APPEAL BRIEF REQUEST FOR REVIEW**

Docket Number 035576/276101

(filed with the Notice of Appeal)

Application Number 10/808,692

Filed March 25, 2004

First Named Inventor Tsutomu Ogihara

Art Unit 2891

Examiner Asok Sarkar

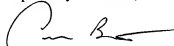
Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

Respectfully submitted,



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Date July 20, 2006

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Attachment  
Reasons for Requesting Pre-Appeal Brief Request For Review

**I. Independent Claim 1 is patentable over the combination U.S. Patent Publication No. 2002/0155053 to Nishiyama and U.S. Patent No. 6,632,489 to Watanabe**

The claimed invention is directed to a coating liquid that can be used to form a porous film. The liquid coating can be applied to a substrate to form a film having a desired thickness. The composition comprises an organic solvent and a condensation product of a silicate and/or organosilicate having specific formulas. The resulting film has superb mechanical strength and excellent dielectric properties, and is particularly useful in semiconductor manufacturing processes.

Claims 1 – 5 have been rejected under 35 U.S.C § 103(a) as being unpatentable over the combination U.S. Patent Publication No. 2002/0155053 to Nishiyama and U.S. Patent No. 6,632,489 to Watanabe.

Nishiyama describes a mesoporous silica material and composite having superior alkali resistance that can be used to form a separation membrane or a catalytic support. The mesoporous material contains a Zr element in the form of a Si-O-Zr bond. Nishiyama further describes a process for producing a filmy mesoporous silica in which a porous substrate is dipped in a solution containing a Si source and a Zr source followed by adding the porous substrate along with the solution to a second solution that contains a surfactant and a pH adjusting agent. The pH adjusting agent can be either a base or an acid, e.g., sodium hydroxide or sulfuric acid. See paragraphs 0029 and 0030. The resulting mixture is stirred to form a gel. The gel and the porous substrate are placed in a pressure vessel for a predetermined time and then removed and calcination is conducted to obtain a mesoporous silica film deposited on the porous substrate. The gel can also be used to form a calcined structure.

Watanabe describes a silica sol having a SiO<sub>2</sub> concentration of 1 to 50 wt% and containing liquid-medium dispersed moniliform colloidal silica particles. The silica sol is characterized in that the colloidal silica particles are linked in rows in only one plane and that the particles are moniliform. The silica sol can be used for forming films and to provide a coating composition for ink jet printing.

Establishing a *prime facie* case of obviousness based upon a combination of reference teachings requires there to be some suggestion or motivation for the proposed combination or modification of reference teachings. The cited references fail to provide this suggestion or motivation for several reasons.

First, the Examiner has failed to provide any credible basis that would suggest the desirability of using an organic solvent in combination with the silica gel of Nishiyama. The Examiner alleges in the Office Action of November 15, 2005 that the motivation for the proposed combination comes from the desire to form an ink that can be applied by an ink jet printer. However, it is clear that the Examiner has

merely reached a conclusion without providing the reasoning on how this conclusion was reached. The Examiner's allegations provide no reasoning as to why one would use an organic solvent in combination with the silica gel of Nishiyama, or why one would even use the silica composition of Nishiyama in an ink jet formulation. This is improper. It is a fundamental tenet of patent law that in making a rejection under 35 U.S.C. § 103 that "[t]he references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination." See MPEP 2141. The Examiner has failed to follow this tenet and has provided no reasoning that would suggest the desirability of using an organic solvent with the silica gel described in Nishiyama.

Moreover, there is no disclosure or suggestion in the references themselves to provide any motivation to modify the gel of Nishiyama in view of Watanabe's teachings. As discussed above, Nishiyama is directed to a gel for forming an alkali resistant film or structure. Watanabe on the other hand, is directed to a sol that is used in ink jet printing. It is clear that the references are directed to two totally unrelated objectives and do not contain the necessary nexus to motivate a combination of teachings. The objectives and aims of the references are unrelated to one another. Therefore, there is no proper basis for the combination of reference teachings. The only possible suggestion of using an organic solvent in the silica composition described in Nishiyama comes from Applicants' own disclosure, which is impermissible.

Second, in order to maintain an obviousness rejection, the proposed combination cannot render the prior art unsatisfactory for its intended purpose. See MPEP 2143.01. As noted above, the Examiner alleges that the motivation to combine the teachings of Watanabe and Nishiyama comes from the desire to produce an ink that can be used in ink jet applications. However, Watanabe actually teaches that its composition is directed to an ink receiving layer—not to an ink. See Abstract. Watanabe specifically states that its intended purpose is to "provide a coating composition for an ink receiving layer for use in ink jet recording medium." See column 4 lines 1- 2. In other words, an intended purpose of Watanabe is to provide a composition that is an ink receiving layer (i.e., a film). In achieving this objective, Watanabe includes multiple statements that teach away from using the silica composition described in Nishiyama as an ink receiving layer. For example, Watanabe describes a moniliform structure in which the silica particles are linked in rows in only a single plane and have large mean pore diameters on the order of 20 to 80 nm. See column 16, lines 35-37. Watanabe further states that in ink jet printing applications, silica compositions having small pore diameters are undesirable because the "amount of vacant space is too small to absorb ink sufficiently." See column 3, lines 16-20. In contrast to the larger pore diameters described in Watanabe, the silica composition described in Nishiyama has pore diameters on the order of 1 to 3 nm, which is significantly less than the pore diameters described in Watanabe. As a result, the pore diameters described in Nishiyama are too small to sufficiently absorb ink, and one of ordinary skill in the

art would therefore not be motivated to use the silica composition described in Nishiyama as an ink receiving layer because the resulting film would be unsatisfactory for ink jet printing.

In the Office Action of March 20, 2006, the Examiner states that the pore sizes described in Nishiyama are for the calcined powders and not for the gel, and the Examiner's intent was to use the gel in the organic solvent and not the calcined powder. However, the Examiner's statement is incorrect and completely ignores the intended purpose of Watanabe. Nishiyama clearly states that an aim of the invention is to provide "a mesoporous silica according to the above [1], which has a particulate form or a filmy form . . . wherein the diameters of the mesopores are 1.0 to 3.0 nm." See paragraphs [0004] to [0008]. Thus, Nishiyama clearly teaches that the resulting porous film has pores having diameters that are 1.0 to 3.0 nm. Further, the Examiner has failed to consider the teachings of the references as a whole and has ignored the purpose of Watanabe, which is to provide a silica composition that when dried forms an ink receiving layer having pore diameters that are greater than 20 nm.

Because there is no teaching or motivation, within the cited references, to combine the disclosure of Watanabe with that of Nishiyama, the Office has failed to establish a *prima facie* case of obviousness and the rejections under 35 U.S.C. §103 of Claim 1 and any claims dependent thereon should be withdrawn.

**Claims 13 and 14 are patentable over the combination of Nishiyama, Watanabe, and U.S. Patent No. 6,576,568 to Mandal et al.**

Mandal describes a sol-gel having a specific precursor solution that can be used to form a film having dielectric constant less than 2.3. Specifically, Mandal describes a precursor solution having a purified nonionic surfactant and an additive that is either an ionic additive or an amine additive. The sol-gel described in Mandal is completely different than that recited in the present claims or described in Nishiyama and Watanabe.

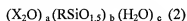
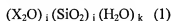
The Examiner alleges that Mandal teaches a sol-gel that can be used to prepare a film having a dielectric constant of less than 2.3 and a modulus of elasticity between 5 and 50 GPa, and it would therefore be obvious to customize the compositions of Nishiyama and Watanabe to have the recited properties. In essence, the Examiner is asserting that since Mandal teaches a sol-gel that can be used to prepare a film having a certain dielectric constant and modulus of elasticity, a film can be prepared from the silica compositions of Nishiyama and Watanabe to have the claimed properties. The Examiner's reasoning is flawed for several reasons.

First, there is no disclosure or suggestion in Nishiyama and Watanabe to produce a film having such properties or that such a film could even be produced from the described sol-gels. There is no teaching in Nishiyama or Watanabe that would lead one to believe that the disclosed compositions could be modified to produce a film having the recited properties, let alone how such a modification would be

performed. The only source for such a teaching can come from Applicants' own teaching, which is impermissible. It is abundantly clear that the Examiner is merely selecting properties from Mandal to make the rejection.

Second, in order to maintain an obviousness rejection, there must be some reasonable expectation of success. However, as noted above, the compositions described in Nishiyama and Watanabe are completely different than that of Mandal. There is nothing in the references that would suggest the compositions could be modified successfully to have the claimed properties. In contrast to an expectation of success, one would actually anticipate failure. Mandal repeatedly emphasizes that in order to obtain a film having the desired properties, the "surfactants are purified to remove impurities from the surfactant molecules, to reduce or eliminate the presence of alkali metal and alkali ion impurities, which are known to be detrimental to integrated circuit fabrication." See column 5, lines 5 - 9. Mandal further credits the improved properties of the film to the presence of specific purified ionic or amine. For example, Mandal states "[v]ery significantly, it was subsequently discovered that a purified surfactant could be used to produce porous films with desired low dielectric constants if specific types of ionic or amine additives were added to the formulation in relatively low concentration. See column 5, line 66 through column 6, line 3. Thus, it is clear from the teachings of Mandal that the claimed properties are present in the film because of the presence of specific additives that are purified to remove alkali impurities. In contrast, the compositions described in Nishiyama and Watanabe both teach the presence of alkalis such as K or Na in the compositions that are used prepare the porous film. Thus, based on the teachings of Mandal, one would expect that the compositions described in Nishiyama and Watanabe could not be used to prepare films having the recited properties. Thus, the Examiner has failed to establish a *prima facie* case of obviousness, and Claims 13 and 14 are patentable over the cited references.

Further, Claim 1 specifically recites that the composition for forming the porous film includes at least one compound selected from the group consisting of silicate represented by formula (1) and organosilicate represented by formula (2)



wherein X independently represents Li, Na, K, Rb, Cs or quaternary ammonium.

The present specification further teaches that the composition of Claim 1 can be used to form a porous film having a dielectric constant that is less than 2.3 and a modulus of elasticity of 5 to 50 GPa. Specifically, Example 2 describes a process for preparing a porous film in which potassium hydroxide was used. The resulting film had a dielectric constant of 2.1 and a modulus of elasticity of 4.5 GPa. In Example 4, the film was prepared using a sodium silicate as a precursor along with sodium

methylsiliconate. The resulting film had a constant of 2.3 and a modulus of elasticity of 6.5 GPa. In view of the teachings of Mandal, these results are quite surprising and contrary to expectations.

Thus, Claims 13 and 14 are patentable over the cited references because the teachings of Mandal are not properly combinable with Nishiyama or Watanabe, and even as combined the claimed invention provides unexpected results.

**Claim 15 is not anticipated by the teachings of Watanabe**

Claim 15 has been rejected under 35 U.S.C. § 102(e) as being anticipated by Watanabe. The Examiner alleges that Watanabe teaches condensing the silicate of formula (1) in the presence of acid to form a composition that is a combination of the condensation product and an organic solvent. The Examiner relies on column 8, line 50 through column 9, line 7 for this assertion. However, the excerpt relied on by the Examiner is the third step in a 4-step process of preparing colloidal silica particles, and does not disclose condensing the compound of formula (1) in the presence of an acid as suggested by the Examiner. Thus, the cited reference fails to disclose or suggest each and every limitation recited in Claim 15.

Further Claim 15 is directed to a coating liquid that comprises the condensation product and an organic solvent as recited in Claim 1. Watanabe fails to describe a silica composition that is in the form of a coating liquid. Thus, Claim 15 is not anticipated by Watanabe because the cited reference fails to disclose or suggest each and every limitation recited in Claim 15.

**Conclusion**

Based on the above remarks, it is respectfully submitted that all pending claims are patentable over the cited references, whether considered individually or in combination. Withdrawal of the rejection and allowance of all claims as currently presented is respectfully requested.